



2882

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#6a
7/2/03
amr

In re the Application of

Group 2882

Martin Feldman *et al.*

Serial No. 09/726,640

Examiner Kao, Chih Cheng G.

Filed: November 30, 2000

For: "Optical Crossbar Switch" (Atty. File No. 0026 Feldman)

AMENDMENT UNDER 37 C.F.R. § 1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450RECEIVED
JUN 30 2003
TECHNOLOGY CENTER 2800

In response to the Official Action dated March 27, 2003, please amend the Claims as shown in Appendix A.

Claims 1 and 2 have been amended, and Claims 25 and 26 have been added.

The amendments to Claims 1 and 2 are in the nature of clarifications, or corrections of manifest clerical errors. These amendments are intended to clarify the Claims, but they are not intended to alter the scope of what was originally intended to be claimed.

07/10/2003 AMISE1 00000006 200096 09726640

01 FC:2202 9.00 DA

CERTIFICATE

I hereby certify that this Amendment under 37 C.F.R. § 1.111 is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on June 23, 2003.

John H. Runnels
Registration No. 33,451
June 23, 2003

Since the various amendments to Claims 1 and 2 are clarifications or corrections of manifest clerical errors, express recitation of the basis for the amendments is not believed to be necessary; such basis may, for example, be found in the Claims themselves as originally filed.

Nevertheless, since the nonobviousness argument below centers on one of the terms that is being changed by this amendment, basis for that amendment will be stated more expressly. In particular, a portion of part (d) of Claim 1 has been amended to read: “the net ~~direction of the~~ angular deflection of the light caused by all said input deflectors, which is a function of the directions of polarization of the light as it passes through each of said input deflectors, causes the light to be directed to the selected receiver.” The “net direction of the deflection of the light” is almost synonymous with the “net angular deflection of the light.” The change is more one of emphasis than a change in meaning: the amended limitation better emphasizes that the angle of light propagation is deflected, and that light is directed to the selected receiver by virtue of the net angle by which the light is deflected. Basis for this amendment found throughout the specification; as just two examples, see e.g. page 4, lines 14-19; and page 5, lines 22-23.

Basis for new Claim 25 may be found, for example, in the specification at page 6, lines 8-9; page 14, line 26 through page 15, line 2.

Basis for new Claim 26 may be found, for example, in the specification at page 4, lines 26-28.

Claims 1-24 were rejected.

Claims 1-26 remain in the application.

Please charge the \$18 fee for the two new Claims in excess of 20, paid as a small entity, to Deposit Account No. 20-0096. If the Office should determine that any additional fee is due, please refer to the Deposit Account Authorization previously filed for this application.

If any extension of time is required, please consider this paper a petition for the total extension of time required.

Reexamination and reconsideration of the application, as amended, are respectfully requested.

Heading numbers in the discussion below (e.g., the number 1 in the following heading) correspond to the headings having the same numbers in the March 27, 2003 Office Action.

1. The Drawing Objections

The Office's objections to the drawings are respectfully traversed.

Citing 37 C.F.R. § 1.84(p)(4), the Office objected to the fact that several drawings used the same reference character to designate multiple instances of similar components. For example, Figure 3 uses the same reference character "20" to refer to multiple polarization control arrays.

37 C.F.R. § 1.84(p)(4) provides in pertinent that "the same reference character must never be used to designate different parts."

Note that the quoted rule forbids using the same reference character to designate "different" parts. However, the rule does not forbid using the same reference character to designate multiple occurrences of similar components.

It should be kept in mind that the purpose of patent drawings is to facilitate understanding of the disclosed invention. But understanding an invention would be impeded, not facilitated, if multiple occurrences of similar parts were designated with different reference numerals. Using the same reference numeral for similar parts makes it easier to understand a drawing.

The Office's own *Guide for Preparation of Patent Drawings* (June 2002 revision) (available on the Internet at <http://www.uspto.gov/web/patents/pubs/pdg0602.zip>) reproduces 25 Example drawing sheets. The Examples are drawings that the Office has promulgated as typifying proper patent drawings that comply with the Office's rules. See Appendix A-4 to the *Guide*.

Note that several of these "officially approved" Example drawings use the same reference character to designate multiple instances of similar components. In Appendix A-4 to the *Guide*, see, for example, the following drawings: Example 3 (reference numerals 30 and 50); Example 8 (reference numerals 2 and 7); Example 10 (Fig. 2, reference numerals 28, 40); Example 14 (reference numeral 5); Example 15 (reference numeral 5); Example 20 (reference numerals 42, 70); Example 21 (reference numerals 15, 15-1, 15-2, 16, 22, 23); and Example 24 (reference numerals 4, 5, 6).

Note Example 20 in particular. Example 20 is offered by the *Guide* specifically as meeting the requirements of 37 C.F.R. § 1.84(p). (See the *Guide* at page A4-42.) Example 20 shows two instances of similar parts that are designated by the same reference numerals, namely numerals 42 and 70. Such designations are, therefore, in compliance with 37 C.F.R. § 1.84(p).

The drawings as submitted in the present application fully comply with 37 C.F.R. § 1.84(p)(4). The modifications proposed by the Office are not required by 37 C.F.R. § 1.84(p)(4), and if made would make the drawings more difficult to understand.

It is respectfully submitted that the objections to the drawings should be withdrawn.

2. The Claim Objections

Introduction

Claims 1, 2, 6, 9, 10-15, 20 and 21 were objected to on the ground that certain limitations lacked antecedent basis. These objections are respectfully traversed for the reasons given below.

On an initial point, although Claim 9 was included in the list of Claims objected to, the Office presented no grounds for objecting to Claim 9.

The Patent Statute Does Not Require Express Antecedent Basis in All Instances.

Before considering the specifics of the Office's objections to the claims, it may be helpful to review briefly the function of "antecedent basis" in patent claims, when antecedent basis is required in a patent claim, and when it is not.

The Patent Statute does not require that claim elements must necessarily have antecedent basis. Rather, 35 U.S.C. § 112, second paragraph requires claims "particularly pointing out and distinctly claiming the subject matter" of the invention. If a particular word or phrase lacks antecedent basis, that is a clue that the word or phrase might possibly be unclear, depending on the entire context in which the word or phrase appears. On the other hand, the word or phrase may be perfectly clear in context. The absence of antecedent basis merely suggests that an Examiner should be alert to consider the possibility that clarity might be lacking in a particular case ; it does not necessarily compel that conclusion, however, depending on the context in which a particular word or phrase is used. See M.P.E.P. § 2173.05(e), first paragraph, fifth and sixth sentences; and third paragraph (citation omitted):

Obviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite. ("controlled stream of fluid" provided reasonable antecedent basis for "the controlled fluid").

.....

A Claim Term Which Has No Antecedent Basis in the Disclosure Is Not Necessarily Indefinite.

The mere fact that a term or phrase used in the claim has no antecedent basis in the specification disclosure does not mean, necessarily, that the term or phrase is indefinite. There is no requirement that the words in the claim must match those used in the specification disclosure. Applicants are given a great deal of latitude in how they choose to define their invention so long as the terms and phrases used define the invention with a reasonable degree of clarity and precision.

One way (though certainly not the only way) in which a word or phrase lacking express antecedent basis may nevertheless be definite is where it has implicit antecedent basis, i.e., that which is inherent in other claim elements that are expressly recited. See M.P.E.P. § 2173.05(e), first paragraph, last two sentences:

Inherent components of elements recited have antecedent basis in the recitation of the components themselves. For example, the limitation “the outer surface of said sphere” would not require an antecedent recitation that the sphere has an outer surface.

With these principles in mind, it follows that each of the terms to which the Office objected is in fact definite. Each of these terms either has express antecedent basis, or has inherent antecedent basis in the same sense as “the outer surface of said sphere.” Applicant has also amended one portion of Claim 1 to clarify a term to which the Office objected.

The Specific Objections

In Claim 1, line 11, “said deflector” was said to lack antecedent basis. Antecedent basis appears in Claim 1, line 10 “each of said input deflectors.” Note that the word “each” makes the latter limitation grammatically singular, not plural, so that “said deflector” has proper antecedent basis.

In Claim 1, line 20, “the first said input” was said to lack antecedent basis. On an initial point, please note that the complete element is not “the first said input,” but rather “the first said input polarization control array.” Antecedent basis for this element appears in Claim 1 as follows:

Line 9 refers to “a series of input polarization-dependent angular deflectors.” Lines 12-13, in turn, refer to “an array of input polarization control elements associated with said each input deflector.” Because there is a series of input deflectors, and because there is an input polarization control array associated with each input deflector, it necessarily follows that there is a series of input polarization control arrays. A “series” is more than just a set of items; rather, a “series” is an ordered sequence of items. An ordered sequence of items has a first item, a second item, etc., through the last item. Thus there is necessarily a “first said input polarization control array,” a second “said input polarization control array,” etc.

In Claim 1, line 22, “the first said input deflector” was said to lack antecedent basis. Antecedent basis for this element appears in Claim 1 as follows: Line 9 refers to “a series of input polarization-dependent angular deflectors.” As just discussed, a series means an ordered sequence of items. Thus there is a “first said input deflector,” a second “said input deflector,” etc.

In Claim 1, line 24, “the preceding said input deflector” was said to lack antecedent basis. As just discussed, there are a series of input deflectors and a series of input polarization control arrays. Thus each “subsequent input polarization control array” after the first polarization control array will have a preceding polarization control array, and each preceding polarization control array has associated with it an input deflector. Thus there is antecedent basis for “the preceding said input deflector.”

In Claim 1, lines 25-26, “said input deflector” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said input deflector,” but rather “said input deflector associated with said subsequent input polarization control array.” Antecedent basis for the input deflectors generally appears in Line 9. As previously discussed, there is “an array of input polarization control elements associated with each input deflector,” and there is a series, or an ordered sequence, of the input polarization control arrays. Thus, except for the last input polarization control array, the claim limitations unambiguously define “said input deflector associated with said subsequent input polarization control array.”

In Claim 1, line 31, “the input controllers” were said to lack antecedent basis. Claim 1 has now been clarified to refer instead to --said input polarization control arrays--. This amendment is intended as a clarification only, and is not intended to change the scope of any of the Claims in any manner. Antecedent basis for the limitation as rewritten appears in Claim 1, line 12.

In Claim 2, line 13, “the first said output” was said to lack antecedent basis. On an initial point, please note that the complete element is not “the first said output,” but rather “the first said output polarization control array.” Antecedent basis for this element appears in Claim 2 as follows: Line 2 refers to “a series of output polarization-dependent angular deflectors.” Lines 5-6, in turn, refer to “an array of output polarization control elements associated with each said output deflector.” Because there is a series of output deflectors, and because there is an output polarization control array associated with each output deflector, it necessarily follows that there is a series of output polarization control arrays. A “series” is an ordered sequence of items, having a first item, a second item, etc., through the last item. Thus there is necessarily a “first said output polarization control array,” a second “said output polarization control array,” etc.

In Claim 2, lines 15-16, “the first said output deflector” was said to lack antecedent basis. Antecedent basis for this element appears in Claim 2 as follows: Line 2 refers to “a series of output polarization-dependent angular deflectors.” As previously discussed, a series means an ordered sequence of items. Thus there is a “first said output deflector,” a second “said output deflector,” etc.

In Claim 2, line 17, “the preceding said output” was said to lack antecedent basis. On an initial point, please note that the complete element is not “the preceding said output,” but rather “the preceding said output deflector.” As previously discussed, there are a series of output deflectors and a series of output polarization control arrays. Thus each “preceding polarization control array” before the last polarization control array will have a preceding polarization control array, and each preceding polarization control array has associated with it an output deflector. Thus there is antecedent basis for “the preceding said output deflector.”

In Claim 2, line 19, “said output deflector” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said output deflector,” but rather “said output deflector associated with said subsequent output polarization control array.” Antecedent basis for the output deflectors generally appears in Line 2. As previously discussed, there is “an array of output polarization control elements associated with each said output deflector,” and there is a series, or an ordered sequence, of the output polarization control arrays. Thus, except for the last output polarization control array, the claim limitations unambiguously define “said output deflector associated with said subsequent output polarization control array.”

In Claim 6, line 1, “said polarization” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said polarization,” but rather “said polarization control elements.” Claim 6 depends from Claim 2, which in turn depends from Claim 1. Antecedent basis for “said polarization control elements” in Claim 6 appears in Claim 1, lines 12-17, and in Claim 2, lines 5-10.

In Claim 10, line 1, “said polarization” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said polarization,” but rather “said polarization control elements.” Claim 10 depends from Claim 1. Antecedent basis for “said polarization control elements” in Claim 10 appears in Claim 1, lines 12-17.

In Claim 11, line 1, “said polarization” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said polarization,” but rather “said polarization control elements.” Claim 11 depends from Claim 1. Antecedent basis for “said polarization control elements” in Claim 11 appears in Claim 1, lines 12-17.

In Claim 12, line 1, “said polarization” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said polarization,” but rather “said polarization control elements.” Claim 12 depends from Claim 1. Antecedent basis for “said polarization control elements” in Claim 12 appears in Claim 1, lines 12-17.

In Claim 13, line 1, “said deflectors” were said to lack antecedent basis. Claim 13 depends from Claim 1. Antecedent basis for “said deflectors” in Claim 13 appears in Claim 1, lines 9-11.

In Claim 14, line 1, “said deflectors” were said to lack antecedent basis. Claim 14 depends from Claim 1. Antecedent basis for “said deflectors” in Claim 14 appears in Claim 1, lines 9-11.

In Claim 15, line 1, “each of said deflectors” was said to lack antecedent basis. Claim 15 depends from Claim 1. Antecedent basis for “each of said deflectors” in Claim 15 appears in Claim 1, lines 9-11.

In Claim 20, lines 1-2, “said deflectors” were said to lack antecedent basis. Claim 20 depends from Claim 1. Antecedent basis for “said deflectors” in Claim 20 appears in Claim 1, lines 9-11.

In Claim 20, line 2, “said deflectors” were said to lack antecedent basis. Claim 20 depends from Claim 1. Antecedent basis for “said deflectors” in Claim 20 appears in Claim 1, lines 9-11.

In Claim 20, line 3, “said polarization” was said to lack antecedent basis. On an initial point, please note that the complete element is not “said polarization,” but rather “said polarization control elements.” Claim 20 depends from Claim 1. Antecedent basis for “said polarization control elements” in Claim 20 appears in Claim 1, lines 12-17.

In Claim 21, line 1, “each said” was said to lack antecedent basis. On an initial point, please note that the complete element is not “each said,” but rather “each said input deflector.” Claim 21 depends from Claim 1. Antecedent basis for “each said input deflector” in Claim 21 appears in Claim 1, lines 9-11.

It is respectfully submitted that each of the objections to the Claims has been overcome, or should otherwise be withdrawn.

3-22. The § 103 Rejections

All Claims were rejected under 35 U.S.C. § 103 as being obvious over a proposed combination of Nishi and Christensen. Claim 1 is the sole independent Claim pending in this application. If independent Claim 1 is novel and nonobvious, it necessarily follows that dependent Claims 2-26 are novel and nonobvious as well. In the interest of brevity, the following discussion therefore focuses on independent Claim 1 only. Applicants reserve the right to present arguments concerning the dependent Claims at a later date, should there appear to be a need to do so.

For the record, it is not conceded that either Nishi or Christensen is available as prior art against any of the claimed inventions. However, for the time being Applicants will show instead why the claimed inventions would not have been obvious over Nishi and Christensen, even if one assumes that those references were available as prior art.

Nothing in either Nishi or Christensen teaches or suggests the following limitation of independent Claim 1:

the net angular deflection of the light caused by all said input deflectors, which is a function of the directions of polarization of the light as it passes through each of said input deflectors, causes the light to be directed to the selected receiver.

Using a net angular deflection to direct light to a selected receiver is neither taught nor suggested by either cited reference. In Nishi there are several discrete locations (switches) at which the destination of each light beam might be altered. The default setting for each switch (cross) is to deflect an entering light beam to a succeeding switch. For a particular light beam, one (and presumably only one) of these switches is selected to route the beam to the desired destination by instead not deflecting it at the selected switch (bar), causing it to be routed to a different switch. In Nishi, the output destination for a particular light beam is determined by the locations of the switches at which the light beam is deflected or is not deflected, and not by its net angular deflection, as required by independent Claim 1 of the present application. See Nishi's Fig. 2 and Col. 5, line 65 through Col. 6, line 26:

For example, when light information from an input light path #i is to be directed to an output light path #j, a voltage is applied to a switch element S_{ij} located at a crosspoint where the input light path #i and output light path #j intersect. This causes the switch element S_{ij} to change from the cross state to the bar state. In a specific example, when the light information from the input light path #0 is to be directed to the output light path #2, a voltage is applied to the switch element S_{02} located at a cross point where the input light path #0 and output light path #2 intersect. Upon application of the voltage, the switch element S_{02} is caused to change from the cross state to the bar state. In this state, the light information is passed through the switch elements, S_{02} , S_{12} , S_{32} , and S_{22} , in this order, and is output onto the output light path #2.

Similarly, if the light information from the input light path #2 is to be directed to the output light path #1, voltage should be applied to the switch element S_{21} . Upon application of the voltage, the switch element S_{21} is caused to change from the cross state to the bar state. In this state, the light information is passed through the switch elements, S_{20} , S_{21} , S_{01} , and S_{11} , in this order, and is output onto the output light path #1.

In this manner, light path switching can be accomplished just by controlling only one switch element, and along any path thus set, the light information passes through four switch elements. This serves to suppress variations in the light information loss and crosstalk, making it possible to perform control for light information amplification and crosstalk reduction in a uniform and simplified manner.

The device of Nishi directs light to a selected output by virtue of the location where a switch is made, not by virtue of the net angular deflection of the light.

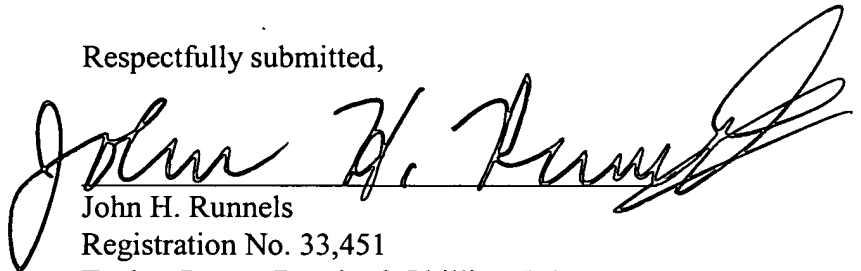
The "beam steering devices" (e.g., prisms or diffraction gratings) of Christensen deflect light by a fixed, unchanging angle, apparently in order to reduce aberrations in the lenses. See, e.g., Christensen's Fig. 5 and Col. 4, line 61 through Col. 5, line 6. Christensen's "beam steering devices" are not switches.

Neither Nishi, nor Christensen, nor a hypothetical combination of the two would suggest the claimed inventions. It is respectfully submitted that this ground of rejection should be withdrawn.

CONCLUSION

It is respectfully submitted that all pending Claims are in condition for allowance. If the Office disagrees with any of these remarks, or if other issues arise that may present an obstacle to allowance, the undersigned would welcome a telephone call to discuss such matters before further action is taken. Otherwise, allowance of Claims 1-26 at an early date is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John H. Runnels", is written over a horizontal line.

John H. Runnels
Registration No. 33,451
Taylor, Porter, Brooks & Phillips, L.L.P.
P.O. Box 2471
Baton Rouge, Louisiana 70821
(225) 381-0257

June 23, 2003